SCULPTURE OF THE IMAGE OF MAN

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SCULPTURE OF THE IMAGE OF MAN

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PROGRESS REPORT

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TO JO ANNE

P R E F A C E

It is fitting to acknowledge the assistance, guidance, and patience of all those who have made this work possible.

Much of the credit goes to Professor Charles Umlauf for his unselfish teaching and superb example as a sculptor. Significant contributions were made by Professor Donald B. Goodall, Chairman of the Department of Art, Professor Kelly Fearing, Associate Professor Mort Baranoff, and Assistant Professor Bill Francis.

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D. F. H.

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P U R P O S E O F T H E T H E S I S

My thesis is composed of a series of sculptures depicting the image of man, and is presented in this written and photographic record.[1] The purpose of this thesis work is to aid in the development of an advanced competence in the art of sculpture.[2] The specific theme and personal direction of the work are explained in the following discussion of the theory, in a demonstration of the evidence (illustrated by the slides and plates), and in a summary discussion.

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L I S T O F S L I D E S

A comprehensive group of mounted color slides of the author's sculpture discussed in the report is contained in the envelope attached to the back cover.

ABBREVIATIONS:

MC, modeled in clay; CP, cast in plaster;
MW, modeled in wax; CB, cast in bronze;
DP, direct plaster; CH, cast in hydrostone;
FG, fiberglass; S, carved in stone;
LS, life size; D, drawing.

Title	Medium	Scale
1. Modeling a small clay sketch		
2. Clay sketch from life		
3. Drawings from "St. John the Baptist" and "Man with a Broken Nose" by Rodin		
4. Drawings from Michelangelo and Rodin		
5. Drawing from life	Charcoal	½ LS
6. Drawing related to Nude Two		½ LS
7. Nude One	MC, CH	½ LS
8. Nude Two	MC, CH	½ LS
9. Nude Three	MC, CH	½ LS
10. Outside view of armature support for life size figures		
11. Inside view of armature support for life size figures		

12.	Nude Four	MC, CH	LS
13.	Nude Four (closeup)	MC, CH	LS
14.	Drawings related to Nude Four and Nude Five		
15.	Nude Five	MC, CH	½ LS
16.	Nude Six	MC, CP	½ LS
17.	Portrait One	MC, CH	LS
18.	Portrait Two	MC, CH	LS
19.	Portrait Three	MC, CH	LS
20.	Portrait Four	MC, CH	LS
21.	Amazon	S (soapstone)	LS
22.	Gladiator	S (limestone)	LS
23.	Musician	S (soapstone)	LS
24.	Sea Nymph	S (soapstone)	½ LS
25.	Juno	MC, FG	½ LS
26.	Juno (before patina)	MC, FG	½ LS
27.	Portrait of a Girl	FG	½ LS
28.	Juno (coating face of waste-mold with fiberglass resin)		
29.	Juno (adding fiberglass cloth to resin layer)		
30.	Juno (removing waste-mold from hardened fiberglass)		
31.	Juno (fitting edges together)		
32.	Mother and Child One	DP	½ LS
33.	Seated Nude	DP, FG coating	LS
34.	Seated Nude	DP, FG coating	LS

35. Drawing relating treatment of surface texture to 30, 31
36. Torso MW, CB 10 inches
37. Torso D 10 inches
38. Molds packed in flasks with sand
39. Bronze ingot placed in crucible
40. Slag raked from molten bronze
41. Crucible lifted from furnace
42. Crucible carried in ring
43. Master founder pouring bronze
44. Investment mold
45. Investment removed from bronze
46. Bronze torso chased
47. Christ MW, CB 10 inches
48. Wax model of Christ
49. Burn-out oven in process of welding frame and shell
50. Burn-out oven in process of ceramic lining
51. Closed furnace
52. Open furnace, crucible in place
53. Tongs for lifting crucible from furnace
54. Flasks made of sectioned steel drums
55. Foundry in place
56. Jo Anne MW, CB LS
57. Nude Three MC, CH LS
58. Seated Nude FG LS
59. Drawing from life Pressed charcoal LS
60. Christ MW, CB 10 inches

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CHAPTER I

THEORY

I base the central idea of this thesis on a personal conviction in a particular philosophy concerning the nature of man[3] and the nature of art.[4] This philosophy is that man is a social individual, similar in emotional, rational, and physical processes, and is possessed of the ability to determine his environment. If man is a social being vitally involved with other men, man is of primary importance to man. Because men are similarly endowed with basic qualities of emotional, rational, and physical expression there is an opportunity for common expression and for common understanding. Because men are capable of determining their environment they are possessed of a common dignity. Art is a function of society. It is the sensual, concrete expression of the abstract reality of existence.[5] The development of a concrete image of man expressive of his dignity is the specific objective of this thesis.

Sculpture is a particularly effective art form for conveying this image. Sculpture occupies three-dimensional space as a real object, and therefore, exerts an impact on the viewer similar to that of the human form. While many people

are relatively insensitive to visual illusion,[6] sculpture is not merely visual but also exists as an actual mass and volume.

The sculptor is concerned more with this mass and volume - this real object - than with words or thoughts; he is concerned more with stone, clay, or molten bronze than with theories, ideals, or philosophies.

The sculptor attempts to infuse the sculptured object with an intuited idea built on his experience. The conception of sculpture is visual and tactile, not verbal; it is developed in a unified manner, not piecemeal. It is drawn from the total of the sculptor's experience. The creation of the sculpture is ideally conceived in a unified culmination of this experience without the least pause for reflection on theories of design, details of anatomy, or relations to philosophy. To the extent that the work is analyzed and worked over it becomes stiff and lifeless. Verbalization cannot reproduce the sensual object with its emotional and intellectual effect. Verbal analysis of the object, enumeration of its qualities, or inventory of its parts cannot equal the sculptured object.

There is no set system by which the sculpture is built. I can allude only to the processes involved in the realization of examples of my sculpture and so give a general idea of those processes. I cannot write a recipe for the duplication of my sculptures by others or write exactly and fully how I

made them myself. The best understanding of the sculptures is achieved by experiencing them firsthand.

Therefore, the bulk of this thesis deals with the actual sculptural processes and media. The written report is purely supplemental to the sculpture.

CHAPTER II

REALIZATION OF THE SCULPTURAL IMAGE OF MAN

My image of man is related in a representative but not an imitative way to the human form in nature.[7] Constant observation of and work from the human figure were necessary to the understanding of its structure and expressive qualities. Working both from life and from the works of the masters aided in this study to gain knowledge of the figure and its expressive potential. The study included numerous small clay sketches created from imagination (Slide 1) and directly from life (Slide 2); and also many drawings both from master works by such sculptors as Rodin (Slides 3, 4), Michelangelo(Slide 4), and from life (Slides 5, 6). An example of the development of style in the drawings as they relate to the main sculptured works is seen in comparing a typical drawing (Slide 6, Plate 5) with some of the sculpture (Slides 7, 8; Plates 6, 7).

The expressive power analyzed in the work of the master sculptors contributed to my own efforts in a general quickening of my expression more than in any specific stylistic way. Research in this manner contributed to the main works and was maintained throughout the thesis work.

The development of the image is represented here by six sculptures of the female nude modeled from life in clay and cast in hydrostone.[8] In these works I have, for the most part, retained or heightened individual physical characteristics. In the process from one work to the next an archetypal or ideal image has developed, based on a generalization of the characteristics of the individual models.

I became gradually more concerned with the similarities of physical structure among individuals. The sculptures became more and more idealized rather than descriptive of individual peculiarities. The sculpture became progressively symbolic of an ideal human image. While the form became more abstract, it remained specifically related to the living organic human form.

Five primary factors contributed to the realization of the image: full convexity of organic form; distortion of proportion to produce an heroic or monumental feeling of height; unity of planar movement and consistent tonality; placement of the piece in relation to the viewer; the scale of the piece in relation to the viewer.

Natural form grows outward in positive convexities, so there was increasing attention given to make the sculptural form full rather than shrunken.

An heroic effect was imparted by the gradual decrease in proportion of the figure from the plinth or feet toward the head.[9] This is the heightening of an optical illusion

or law of perspective. A figure seen from a close and low vantage point will seem distorted in this manner. The farther part of the figure seems smaller than that nearest the eye. Because of this distortion the sculptures are forced to appear as though seen from below.

An overall unity of each form of each sculpture was achieved through integrating and relating planes moving over the figure. Tonality, or uniform definition of form, and equal surface texture throughout the sculpture are also important to attain unity.

In Nude One (Slide 7, Plate 6) the fullness of form is lacking especially in the upper torso and arms, resulting in an emaciated feeling. The gradual distortion in decreasing proportion from feet to head is too obvious. Planar and tonal unity are not consistent, as seen in the contrast of the simplified legs with the rather definite upper area of the torso.[10]

Nude Two (Slide 8, Plate 7) is still lacking in fullness, and the result combined with the height distortion is one of some gauntness. The overall unity is improved over Nude One in the greater consistency of definition. The modeling is too harsh and reflects the artist's drawings of the period. The exaggerated distortion or proportion is also evident in the drawing (Slide 6, Plate 5).

Nude Three (Slide 9, Plate 8) was made life size to aid in the refinement of definition of form, distortion, and

planar and tonal unity. I felt the larger scale made the problem more accessible. I also felt that this scale increased the immediacy and credulity of the objective presence of the figure to the viewer in its closer relation to the scale of the viewer. The life size approach did bring the problems closer to hand in that they were more readily perceived. The scale also presented new problems of supporting the weight of clay, which was about three hundred pounds. A rather sturdy support was required[11] (Slides 10, 11; Plates 9, 10).

Nude Four (Slides 12, 13; Plate 11) evidences fuller definition of form, a minimized distortion and better unity of plane and tone. The fullness of form and smoother tonality relates better to the feminine character but lapses nearer to naturalism.[12] However, the more generalized figure is less controlled by the individual character of the model than the previous works.

Nude Five (Slide 15, Plate 12) is full in form without becoming vague in definition and so results in a less naturalistic tonality than Nude Four. However, the more definite form and movement of plane echo the stiffness of the works preceding Nude Four.

I feel that Nude Six (Slide 16, Plate 13) represents a successful culmination of my ideal in its balance of full form, more subtle distortion of proportion, and consistent planar movement and tonality. The figure is heroic in feeling yet retains some individual character. It is feminine in its soft tonality yet not overly naturalistic.

Four portraits from life modeled in clay and cast in hydrostone followed the six previously discussed figures in their general development of fullness of form, planar abstraction and tonality.[13] Because they are portraits, there was a difference of emphasis. The figures are a general heroic type based on individual models. The portraits are, however, of specific individuals whom I have tried to imbue with a quality of heroism.[14] Also, here the distortion toward height does not apply.[15] The scale is life size since I believe that this is the best scale for a faithful portrait as well as best representing the objective presence of the individual.[16]

Portraits One (Slide 17, Plate 14) and Two (Slide 18) are fairly successful insofar as they are a full interpretation of organic form and overall consistent tonality. Portrait Three (Slide 19) is similar but is more subjective in the "transcendent" stare of the eyes[17] and the subjective enlarging of the features. The fourth portrait (Slide 20, Plate 15) is very objective. Its features are described in a definite planar fashion similar to carving. There is more economy of formal definition in Portrait Four. The grasp of forms is broader. The larger forms are presented more for themselves, with less concern for surface detail and texture. This emphasis on a more profound and subtle definition of the mass of the form led to experiment in stone.

Four modest sculptures were carved in soft inexpensive stone.[18] The four sculptures are three imaginary portraits and a small composition of a figure. From these carvings I learned to plan more carefully my approach to the realization of form in a medium. Carved form is simpler and to me more direct, more subtle yet clearer, and so is more profound than modeled form.[19]

Previously I had worked largely in clay. Clay is relatively yielding and manageable. It allows for experimentation and alteration. Forms may be made larger, smaller, or may be altered at will. The stone is a harder taskmaster in several ways. If too much stone is removed it is often impossible to correct the mistake.[20] The simple physical task of carving induces the sculptor to get as much result as possible with the least expense of effort. Detailed undercutting is impractical in execution and for durability. The medium requires a very carefully planned and simply executed definition of form.

The carving was done by hand with traditional stone carver's tools.[21] Soapstone was used for the Amazon (Slide 21), Musician (Slide 23), and Sea Nymph (Slide 24, Plate 17). The Gladiator (Slide 22, Plate 16) was carved in limestone. The Amazon is an example of the care which should go into the selection of the stone. It was not pure soapstone and was of an inconsistent hardness which complicated carving and precluded success. The Sea Nymph stone was of somewhat

better quality and stones for the Gladiator and Musician were nearly ideal.

No more stone carving was attempted. The expense, weight of the stone, and difficulty in carving I felt to be impractical for prolonged student experimentation.[22]

At this point several factors may be listed which have emerged as relatively constant in the formulation of my sculptural vocabulary.[23] The sculptural form is related to nature representationally; an individual character is retained but idealized; the full convexity of organic form is emphasized; proportion is distorted in a forced perspective to effect or emphasize a soaring height, together with the placement of the piece higher than the spectator; unity is stressed by related planar movement and consistent tonality; the effect of scale (the spectator is subjectively affected by a life size mass equal to his own; this scale lends the sculpture an actual objective presence related directly to the human form in nature); and economy of surface detail with emphasis on the definition of the solid mass.

While I had arrived at a general sculptural form for my ideal image, there remained a specific technical problem. I needed a medium of less weight, of less expense, and more easily workable than clay or stone, a medium that could be used for life size figures, and not be impractical to move as is stone or cast hydrostone, or require complicated and confining mechanical support such as the one used for the large clay figures.

Time and money were considered. Almost as much time and effort were spent plugging clay, building armatures, and building supports for the clay figures as in modeling them. And stone is particularly expensive and hard to move.

I experimented first with casting clay figures in hollow fiberglass. This, it seemed, would at least eliminate the weight of the finished piece. To see if the fiberglass would work at all, a small portrait (Slide 27) was modeled in clay and a waste-mold was made of it.[24] A hollow cast was made from the mold rather successfully. It was extremely light and of high tensile strength.[25] Considering the light weight and the strength of the portrait, I decided to cast a draped female figure (Slides 25-31; Plates 18-20) modeled in clay, in fiberglass. The cast came out quite satisfactorily.[26] The fiberglass faithfully reproduced detail and texture. I had combined a fine marble aggregate with the fiberglass in hopes of achieving a stone-like effect and specifically to eliminate the glassy surface characteristic of the medium. The surface was matt but not a good color so the piece was "patinaed" or painted. I discovered that paint adheres quite well to the fiberglass and weathers equally well.[27]

The aforementioned project solved the weight problem. However, the process was just as tedious since it involved reproduction by casting. The materials were still too expensive for a great deal of private work and the chemicals were poisonous.[28]

A previous work had been done by the direct plaster method, which incorporated both an additive and a subtractive process.[29] (Slide 32, Plate 21). The advantages of both processes are obtained - the tractability of clay and the direct clarity of carving - without the problem of supporting the limp weight of the clay or the problem of not being able to correct mistakes. A simple lightweight armature sufficed to hold the mass of plaster since each successive application hardened quickly and helped to support the entirety.

I built a life size seated nude (Slides 33, 34; Plate 22) for experimentation. The problem of weight was overcome by the addition of a lightweight aggregate, which also thickened the consistency of the plaster and made it easier to handle. The findings of the fiberglass experiment were incorporated to lend permanence to the sculpture by coating the surface with a fiberglass "skin."[30]

This medium allowed the fullest realization of the sculpture in relation to the stylistic factors previously enumerated. Its basic advantage in this is the combination of modeling and carving made possible, and the ease with which the life size scale can be utilized. Its simple direct sculptural form is related to stone carving while it avoids the major difficulties and expense of working in stone. Even the texture obtained by the use of the plaster rasps in the carving lends itself to an exciting tonality

that I personally prefer and had achieved previously in drawing (Slides 34, 35).

Possibly the most permanent sculptural medium is cast bronze. Because of its permanence, I want eventually to cast my best works in bronze. It was desirable to learn the rudiments cf the bronze casting process firsthand.[31]

A small torso (Slide 37, drawing; Slide 36; Plate 24) was modeled in wax and cast in bronze (Slides 38-46; Plates 25, 26) by the lost wax process.[32] For further experience, and to insure an understanding of the process, a bronze foundry was built (Slides 49-55; Plate 36) and the process carried out several more times[33] (Slides 47, 48, 56; Plate 27).

Plate 1.--Drawings from Life
8" X 10" Pen and ink

Plate 2.--Drawing from Life
36" X 24" Pressed charcoal


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Plate 3.--Drawings from Master Works

Left: From plate of Sistine Chapel frescos by Michelangelo

Right: From plate of Age of Bronze by Rodin

Plate 4.--Drawings from
plates of sculptures by Rodin

Left: St. John the Baptist

Right: Man with a Broken Nose

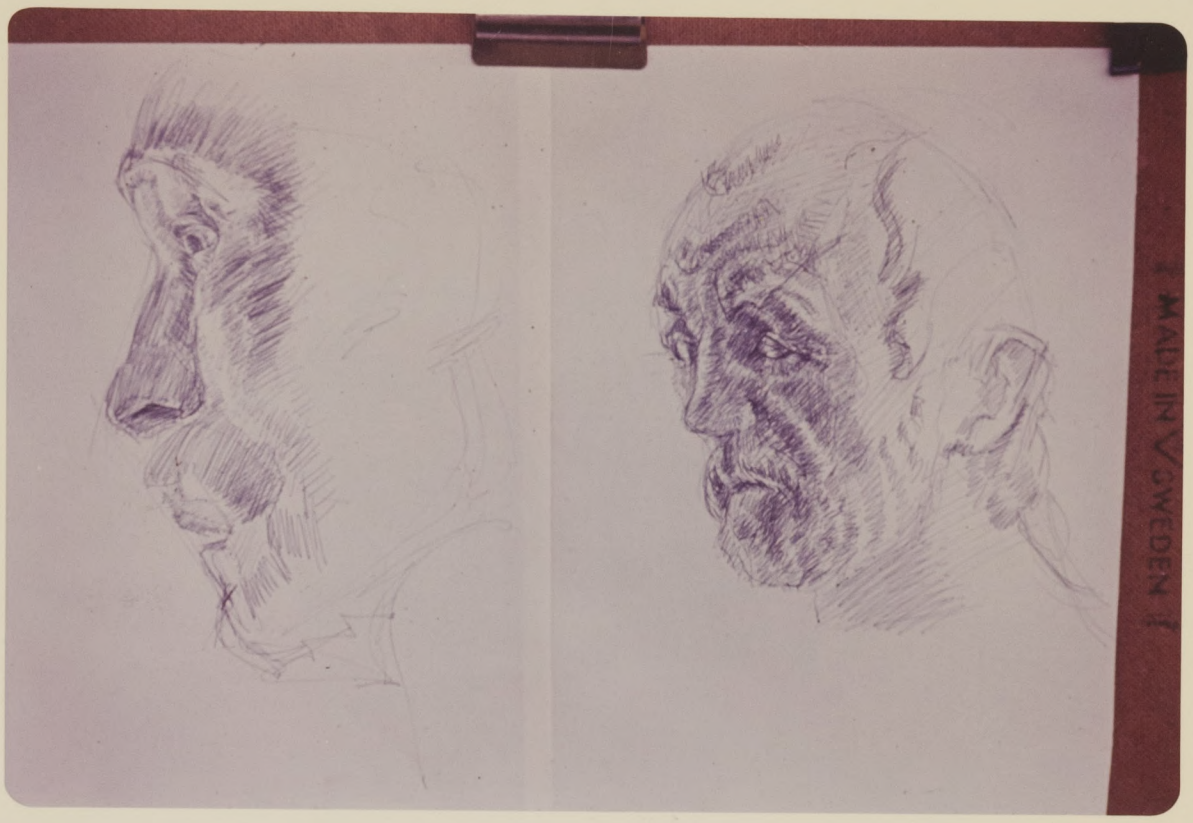
MADE IN SWEDEN

Plate 5.--Drawing from Life
24" X 36" Charcoal and conte

Plate 6.--Nude One
Cast from clay in hydrostone
½ Life size

Plate 7.--Nude Two
Cast from clay in hydrostone
½ Life size

Plate 8.--Nude Three
Cast from clay in hydrostone
Life size

Plate 9.--Armature Support (Exterior)

Plate 10.--Armature Support (Interior)

Plate 11.--Nude Four
Cast from clay in hydrostone
Life size

Plate 12.--Nude Five
Cast from clay in hydrostone
½ Life size

Plate 13.--Nude Six
Cast from clay in hydrostone
½ Life size

Plate 14.--Portrait One
Cast hydrostone
Life size

Plate 15.--Portrait Four
Cast hydrostone
Life size

Plate 16.--Gladiator
Carved limestone
Life size

Plate 17.--Sea Nymph
Carved soapstone
½ Life size

Plate 18.--Juno
Fiberglass
5/8 Life size

Plate 19.--Juno (in process)
Fiberglass
5/8 Life size

Plate 20.--Juno (in process)
Fiberglass
5/8 Life size

Plate 21.--Mother and Child
Direct plaster
2/3 Life size

Plate 22.--Seated Nude
Direct plaster and vermiculite
Fiberglass coated
Life size

Plate 23.--Drawing from Life
24" X 36" Felt pen

Plate 24.--Drawing for Bronze Torso
8" X 10" Pencil

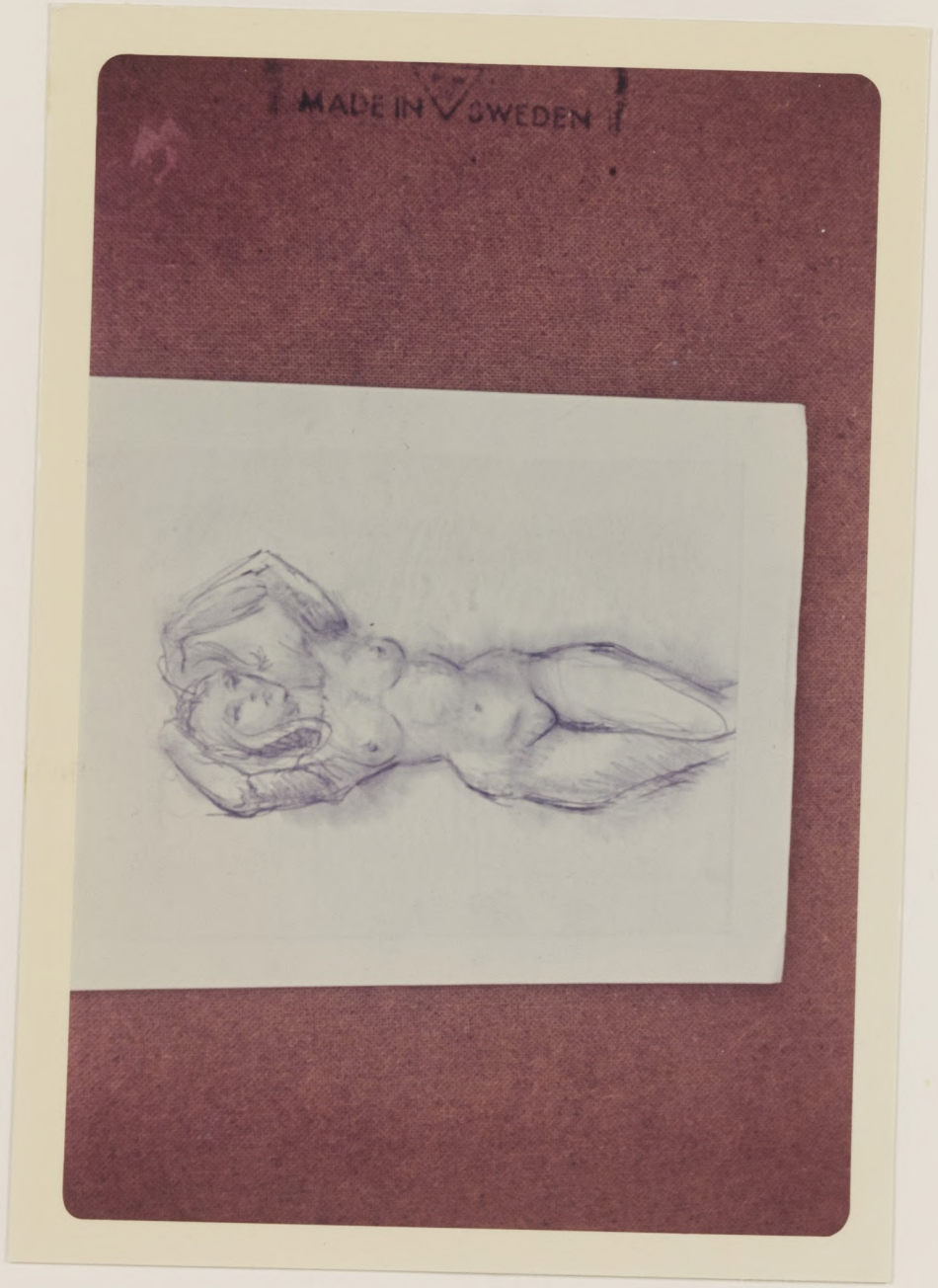
MADE IN SWEDEN

Plate 25.--Bronze Casting Process
Crucible in ring-shank

Plate 26.--Master Founder Pouring

Plate 27.--Wax Model for Bronze Christ
10" high

Plate 28.--Furnace with Crucible in Place

Plate 29.--Drawing from Life
36" X 24" Pressed charcoal


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Plate 30.---Seated Nude in Pastoral Setting

CHAPTER III

SUMMARY

Through sculpture I am trying to express the natural dignity of man. For this purpose I believe a sculptural form related directly and simply to the human form in nature is most effective.

My stylistic development has been based on a constant study of the human form and its expression, both from life and from works of master sculptors. Generally the image has become progressively more archetypal. Specifically, several rather constant factors have emerged during my thesis work: (1) relation of sculptural form to nature representationally; (2) individual character retained but idealized; (3) emphasis on the full convexity of organic form; (4) distortion of proportion in a forced perspective to effect or emphasize height; (5) placement of piece higher than spectator; (6) subjective effect of scale of piece in relation to spectator; (7) emphasis on definition of solid mass with economy of surface detail.

Technical development has been directed toward the fullest utilization of the style. After the early use of

the clay medium, works were executed in stone, fiberglass, and direct plaster. A combination of direct plaster and a lightweight concrete aggregate covered with fiberglass was finally developed and found to be most effective for my purposes.

The technical study culminated in the casting of bronzes by the lost wax process, and in the subsequent building and operation of a small private foundry.

All of these developments are best illustrated by the sculptures themselves. I am still working toward a fuller realization of my goal, but each of the sculptures has been successful to some extent in expressing my personal statement. They stand on their own as individual sculptures as well as landmarks in the development of a style (Slide 58, Plate 4).

I believe the stylistic factors and the related technical processes (described in detail in the Notes) together with constant studies from life (Slide 59, Plate 29) have set the direction of the work and will contribute significantly to my sculpture in the future (Slides 48, 60; Plate 22).

N O T E S

[1]The University of Texas, Graduate School: 1960-1961 and 1961-1962, with Announcements for 1962-1963 and 1963-1964 (The University of Texas Catalogue Number: Part VII; Austin: 1962), p. 63: "The thesis will consist of a work or set of works of art, submitted with written record, analysis, and evaluations including record of working drawings or stages of completion."

[2]Ibid., p. 42: "The objective of the master's programs is to give the student experience in advanced study."

[3]John Herman Randall, Jr. and Justus Buchler, Philosophy: An Introduction (College Outline Series, No. 41; New York: Barnes and Noble, 1942), chap. xvii, "Ethical and Aesthetic Values," p. 243-271.

S.E. Frost, Jr., Ideas of the Great Philosophers: A Survey of Their Basic Teachings (New York: Barnes and Noble, 1953).

Paul Weiss, The World of Art (Carbondale: Southern Illinois University Press, 1961), p. 5: The artist attempts to present an ideal value in a sensory guise; p. 7: Weiss relates art to the other basic cultural pursuits; p. 8: The work of art is a substance opposed to whatever other substances there may be.

[4]S. E. Frost, Jr., op. cit.

[5]Paul Weiss, op. cit., p. 5.

[6]Frederick Logan, Growth of Art in American Schools, (New York: Harper, 1955). "According to our best contemporary knowledge ..." about one-fourth of the population is more stimulated by kinesthetic sensation - by touch - than by sight.

[7]Kenneth Clark, The Nude in Art: A Study in Ideal Form (New York: Doubleday, 1953), p. 55. Clark traces the development of the Greek "Apollo" type sculpture from archaic, to naturalistic, to Polykleitos. The Polykleitan style: A tightly formalized abstraction of great vitality emphasized by its narrow channel. Pp. 68-69: Torso of Doryphorus.

[8]The smaller figures were built in clay on a standard armature of 3/8" lead wire (see Jack C. Rich, The Materials and Methods of Sculpture (New York: Oxford University Press, 1947); and Malvina Hoffman, Sculpture Inside and Out (New York: W. W. Norton and Company, 1939). The life size works were built on armatures made of ¼", ½", ¾", and 1" steel reinforcing rod. The ¼" rod allowed for flexibility but could not support much weight. The ½" rod was stronger but still tended to sag. The heavier rods held well but were extremely difficult to work with. Perhaps very heavy ¾" to 1" lead would be more satisfactory.

Planning was necessary to relate the composition of the figure to its actual construction on the armature. Schematic sketches were made for this purpose. (See Slide 14).

The first large armatures were supported by pipe on heavy platforms equipped with rollers. These proved impractical because the pipe was too light (1") and sagged, and also the platforms had to be blocked up for stability, thus cancelling the usefulness of the casters. A heavy steel armature support was built which solved the problem of stability but also cramped work on the piece. (See pp. 15 and 16 above). The ideal support would be a heavy vertical pipe set in bearings or free sockets in ceiling and floor so that it could be rotated.

These clay pieces were cast from simple plaster waste molds in "hydrostone" (a product of U. S. Gypsum, 11,500 pounds per square inch compressive strength), a hard, weatherable material.

[9]This distortion somewhat relates to the nine-heads-high proportion of heroic Greek sculptures.

[10]An example of this planar movement is the continuous plane relating the instep, inner shin, inner vastus, sartorius, oblique, and spinus erectus.

[11]The armature was a horizontal 4" "H" beam braced at 90° to a vertical 4" channel iron, bedded in a 6" channel iron. A series of matched holes in each channel allowed the height of the arm to be adjusted. The steel support was bolted to a 12' long, 12" square timber anchored in 3 feet of concrete and brick.

[12]Kenneth Clark, op. cit. The form of this figure was influenced by the great Indian Yakshi type figures such as those on the Great Stupa at Sanchi, first century B. C.

[13]See factors listed above, p. 12.

[14]The intention was to instill the portrait of the individual with heroic properties and so to imply the heroic potential believed to be in every individual.

[15]The problem of a likeness in portraits requires that the work be viewed from an angle related to that from which the subject is customarily seen, i.e., a tall person from slightly below; a short person from slightly above. Distortion in this instance of portraiture complicates this effect.

[16]The less the departure from actual scale, the stronger the objective relation to the spectator and the more powerful the subjective effect produced.

[17]This effect occurs in many of the less realistic phases of sculpture, such as in the colossal head of Constantine the Great, early fourth century, A. D., Capitoline Museum, Rome.

[18]Jack C. Rich, op. cit.

[19]Detail is impractical in stone and goes against its character. Simpler forms must imply, rather than duplicate. Instead of imitating natural form, it is best to distill its essence.

[20]Broken fragments can occasionally be repaired with epoxy glue or fiberglass. A repair of this sort was made during the progress of the Sea Nymph.

[21]Malvina Hoffman, op. cit.
Jack C. Rich, op. cit.
The form was blocked out with a bush hammer and with a bull chisel. The carving was done by hand with toothed, flat, and pointed chisels. Some abrasives were used for the finishing. The soapstone was treated with a solution of turpentine and linseed oil.

[22]The price of marble averages about $8 a cubic foot, F. O. B. Vermont or Georgia.

[23]The character of the carving process was added to the factors listed above on p. 12.

[24]A waste-mold was used in casting this as in casting the other clay sculptures.

[25]The resilient tensile strength of the fiberglass enabled it to resist blows which would tend to smash more brittle stone.

[26]Fiberglass casting process (Slides 28-31; Plates 19, 20):
a. Waste mold sealed with acid-resistant plastic coating.

b. Mixture of resin and acid to equal part of Number 00 Verde Antique marble aggregate spread ¼" thick in sections of the mold. (It was necessary to bake the aggregate to avoid moisture). (Slide 28).

c. After hardening 24 hours, the initial layer was backed with strips of fiberglass mat and cloth saturated with liquid resin. (The rate of hardening is dependent on temperature. Artificial heat speeds up the process). (Slide 29).

d. The plaster mold was broken away from the hardened fiberglass. This is easily achieved because the mold will shatter at a blow, but the fiberglass is springy (Slide 30).

e. The edges of the cast pieces were fitted and joined with more of the fiberglass mixture (Slide 31, Plate 20).

f. The piece was "patinaed" to resemble bronze: (1) coat of metallic gold paint; (2) oil and turpentine medium (Slides 25, 26; Plates 19, 20).

[27]Because no moisture is introduced into the medium, the paint adheres perfectly.

[28]Fiberglass materials are expensive unless they are bought in great quantity, i.e., $7 per gallon for resin, $2.50 per yard for mat and cloth.

The chemicals are highly toxic, both internally and externally.

[29]Direct plaster process:

a. A light steel armature of ¼" rod is constructed.

b. Basic forms are built up with hemp fiber and plaster.

c. Creamed plaster is thickened with dry plaster in small quantities and applied to wet plaster with Italian plaster spatulas.

d. Alteration and definition can be made by carving the plaster with plaster rasps and knives.

e. When thoroughly dry, the work may be painted to alleviate the dead whiteness of the plaster.

[30]For the seated nude the direct plaster process was altered:

a. Vermiculite concrete aggregate was added to the plaster in the ratio of one part vermiculite to two parts plaster by volume. This produces a good working consistency and lightens the weight by about one third. Vermiculite weighs approximately one twelfth as much as plaster by volume.

b. The finished sculpture was dried in a very hot kiln room and then coated with clear liquid fiberglass. (The surface was impregnated with several coats of liquid fiberglass thinned with Styrene, and then coated with a ¼" thick layer of unthinned liquid applied with a brush. The thickness shrinks to 1/8" on hardening).

[31]It is desirable that the sculptor follow his work through the casting process at the foundry in order to insure that it retains his personal style in form, proportion, texture, and color.

[32]Bronze casting process (for small solid pieces) (Slides 38-46; Plates 25-27):

a. Work modeled in wax (Slide 48, Plate 27).

b. Gates and vents of wax attached.

c. Wax coated with investment (one half plaster, one half crushed fire brick) to a thickness of about 3". A wire is wrapped around the mold near the outside surface to add strength and to facilitate removel of the investment (Slide 44).

d. Wax completely burned from mold in kiln.

e. Hot molds placed in steel flasks and buttressed with tamped sand. (The molds should be removed from the kiln so they are ready to be poured at the moment the bronze reaches the proper temperature for pouring) (Slide 38).

f. The crucible is pre-heated in the furnace and the bronze ingots are lowered slowly into the crucible so that they will heat gradually (Slide 39).

g. Excess slag is skimmed from the top of the molten bronze before it is removed from the furnace (Slide 40).

h. The crucible is removed when the bronze reaches a temperature of 1850° to 1950° F. and is placed in the ring of the pouring shank (Slides 41, 42).

i. As the bronze is poured, any slag remaining on the surface is held back with a slag rake (Slide 43).

j. After the bronze has cooled, the investment is stripped away and the sprues cut off (Slides 44, 45).

k. Irregularities on the surface are chased off and the bronze is cleaned with muratic acid (Slide 46).

l. Appropriate acids are applied to the surface with heat to produce the desired patina (potassium bitartrate, one part; sodium chloride, one part; ammonium chloride, two parts; were used for an "ancient green" effect. See slides of bronzes (Slides 36, 47). See Hoffman, Rich).

[33]Foundry building procedure (see foundry Slides 49, 50, 55):

The foundry consists of (1) an oven for baking the molds (Slides 49, 50); (2) a furnace to melt the bronze (Slides 51, 52; Plate 28); (3) a sand area and flasks where the bronze molds are placed for pouring; (4) tools for handling the crucible and bronze.

The oven and furnace were made of steel insulated with a 4" refractory ceramic liner. A light refractory of one part Lumnite high temperature cement and four parts vermiculite aggregate was used.

The gas to the furnace was supercharged with air to attain the necessary temperature to melt the bronze. This was achieved with an air blower attached to the gas line.

The oven was made by adapting a barracks heater.

The furnace structure and flasks (Slide 54) were made from sectioned oil drums.

We used a Number 30 pre-annealed silicon carbide crucible (a product of Union Carbide) with a 90-pound capacity for bronze (Slide 53).

The tongs for removing the crucible from the furnace are of a scissors type that we made of welded ¾" steel reinforcing rod and ¼" steel plate.

We obtained a double-ring shank for pouring bronze from the crucible (Slides 42, 43).

An "85, 5, 5, 5" number 15 bronze ingot was used: 85% copper, 5% tin, 5% lead, 5% zinc.

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1. Modeling a small clay sketch

2. Clay sketch from life

3. Drawings from “St. John the Baptist” and “Man with a Broken Nose” by Rodin

4. Drawings from Michelangelo and Rodin

5. Drawing from life

6. Drawing related to Nude Two

7. Nude One

8. Nude Two

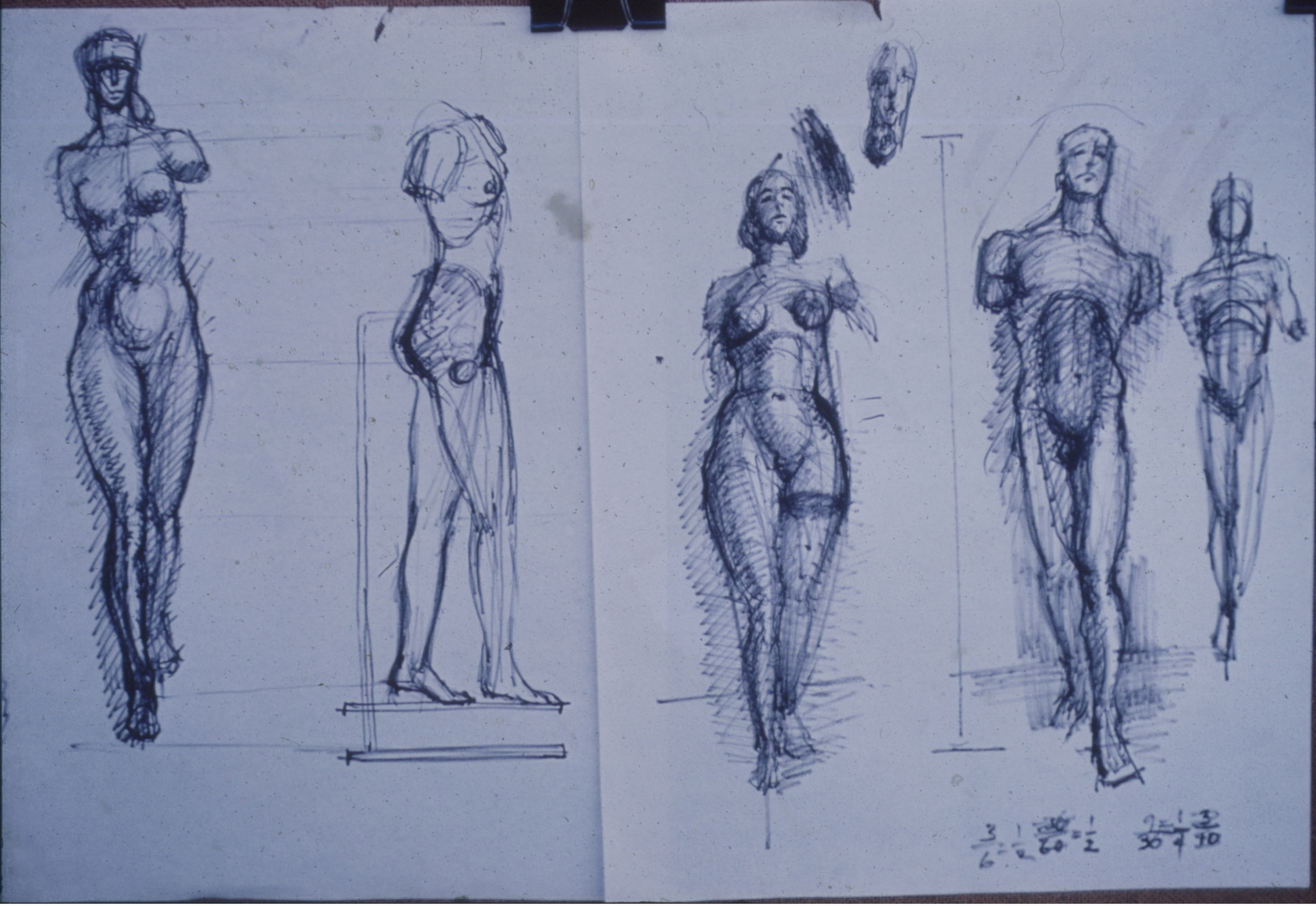
9. Nude Three

10. Outside view of armature support for life size figures

11. Inside view of armature support for life size figures

12. Nude Four

13. Nude Four (closeup)



14. Drawings related to Nude Four and Nude Five

15. Nude Five

16. Nude Six

17. Portrait One

18. Portrait Two

19. Portrait Three

20. Portrait Four

21. Amazon

22. Gladiator

23. Musician

24. Sea Nymph

25. Juno

26. Juno (before patina)

27. Portrait of a Girl

28. Juno (coating face of waste-mold with fiberglass resin)

29. Juno (adding fiberglass cloth to resin layer)

30. Juno (removing waste-mold from hardened fiberglass)

31. Juno (fitting edges together)

32. Mother and Child One

33. Seated Nude

34. Seated Nude

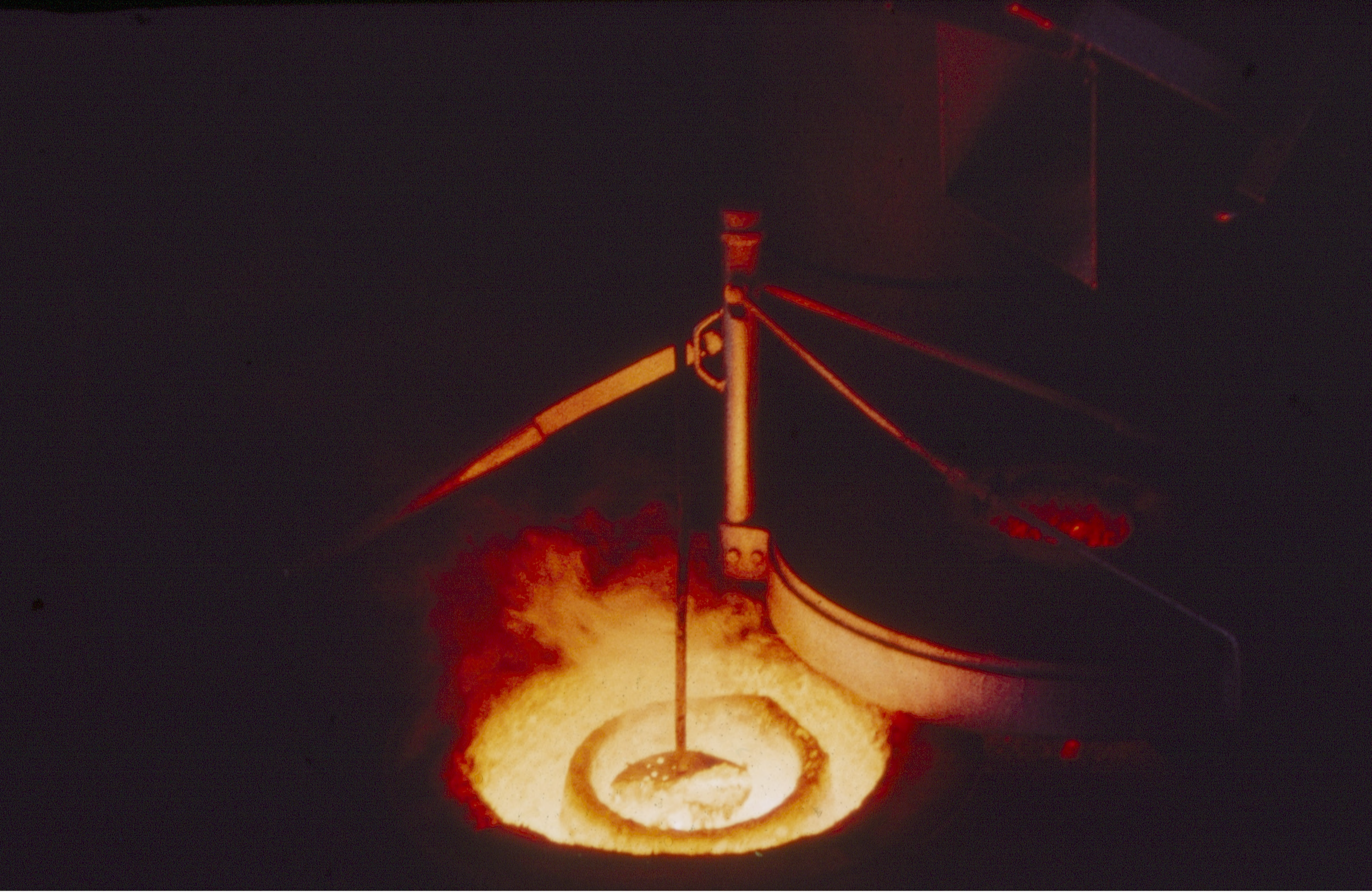
35. Drawing relating treatment of surface texture to 30, 31

36. Torso

37. Torso

38. Molds packed in flasks with sand

39. Bronze ingot placed in crucible



40. Slag raked from molten bronze

41. Crucible lifted from furnace

42. Crucible carried in ring

43. Master founder pouring bronze

44. Investment mold

45. Investment removed from bronze

46. Bronze torso chased

47. Christ

48. Wax model of Christ

49. Burn-out oven in process of welding frame and shell

50. Burn-out oven in process of ceramic lining

51. Closed furnace

52. Open furnace, crucible in place

53. Tongs for lifting crucible from furnace

54. Flasks made of sectioned steel drums

55. Foundry in place

56. Jo Anne

57. Nude Three

58. Seated Nude

59. Drawing from life

60. Christ